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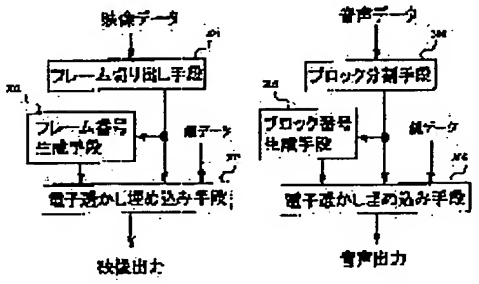
(54) ELECTRONIC WATERMARK EMBEDDING DEVICE, OUTPUT CONTROLLER AND STORAGE MEDIUM READ BY COMPUTER

(57)Abstract:
PROBLEM TO BE SOLVED: To imbed an electronic watermark, which can protect totally a copyright of contents including video and audio data against interception of the video and audio data, to the contents.
SOLUTION: A frame segmentation means 301 divides received video data into frames and gives a frame number to each frame. Then an electronic watermark embedding means 303 receives each frame, each frame number and key data such as electronic watermark embedding position information stored in a nonvolatile memory and embeds the frame number to each frame as electronic watermark information. A block division means 304 divides audio data into blocks, gives a block number to each block, and an electronic watermark embedding means 306 receives each block, each block number and key data and embeds the block number to each block as electronic watermark information.



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* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] Digital-watermarking embedding equipment characterized by establishing an information generation means to generate embedding information to each above-mentioned information sequence in contents including two or more information sequences, respectively, and the embedding means which embeds each embedding information by which generation was carried out [above-mentioned] as digital watermarking to each information sequence.
[Claim 2] Digital-watermarking embedding equipment according to claim 1 characterized by each embedding information which the above-mentioned information generation means generates being the information related mutually.
[Claim 3] Digital-watermarking embedding equipment according to claim 1 with which each embedding information which the above-mentioned information generation means generates is characterized by being in agreement.
[Claim 4] It is digital-watermarking embedding equipment according to claim 1 which the above-mentioned information generation means generates the identifier which identifies the above-mentioned partial information sequence, and is characterized by the above-mentioned embedding means embedding the identifier by which generation was carried out [above-mentioned] at the above-mentioned partial information sequence as digital watermarking while establishing a division means to divide the above-mentioned information sequence and to generate a partial information sequence.
[Claim 5] Digital-watermarking embedding equipment according to claim 4 characterized by the above-mentioned identifier being a number.
[Claim 6] Digital-watermarking embedding equipment according to claim 1 characterized by expressing one information by combining the above-mentioned embedding information embedded for each above-mentioned information sequence.
[Claim 7] Digital-watermarking embedding equipment according to claim 1 characterized by error-correcting-code-izing at least one of the above-mentioned embedding information.
[Claim 8] Digital-watermarking embedding equipment according to claim 6 characterized by error-correcting-code-izing information expressed by combining the above-mentioned embedding information.
[Claim 9] Digital-watermarking embedding equipment according to claim 1 characterized by for the above-mentioned information generation means embedding by the operation from at least one of the above-mentioned information sequences, generating information, and the above-mentioned embedding means embedding the above-mentioned embedding information as digital watermarking at least other one of the above-mentioned information sequences.
[Claim 10] Digital-watermarking embedding equipment according to claim 9 with which the above-mentioned information generation means is characterized by calculating the above-mentioned whole information sequence or the compression value of a predetermined part as the above-mentioned embedding information.
[Claim 11] Digital-watermarking embedding equipment according to claim 9 characterized by establishing an encryption means to encipher the above-mentioned embedding information generated by the above-mentioned information generation means.
[Claim 12] Digital-watermarking embedding equipment according to claim 9 with which the above-mentioned information generation means is characterized by asking for the digital signature of the above-mentioned whole information sequence or a predetermined part as the above-mentioned embedding approach.
[Claim 13] A division means to divide at least two of the above-mentioned information sequences, and to generate a partial information sequence is established. The above-mentioned information generation means The above-mentioned partial information sequence generated from at least one of the above-mentioned information sequences is embedded, and it considers as information. The above-mentioned embedding means Digital-watermarking embedding equipment according to claim 1 characterized by embedding the above-mentioned embedding information as digital watermarking for the partial information sequence generated from other one of the above-mentioned information sequences at least.
[Claim 14] Digital-watermarking embedding equipment according to claim 13 characterized by establishing an encryption means to encipher the above-mentioned partial information sequence which is the above-mentioned embedding information.
[Claim 15] It is digital-watermarking embedding equipment according to claim 1 characterized by for the above-mentioned information generation means embedding the decode key for decoding the above-mentioned encryption, and generating it as information while establishing an encryption means to encipher at least one of the above-mentioned information sequences, and the above-mentioned embedding means embedding the embedding

information on the above-mentioned decode key at least other one of the information sequences.
[Claim 16] Digital-watermarking embedding equipment according to claim 1 characterized by two or more above-mentioned information sequences being speech information and image information.
[Claim 17] Digital-watermarking embedding equipment according to claim 1 characterized by being data showing the predetermined object in the contents in which two or more above-mentioned information sequences contain the data showing two or more objects.
[Claim 18] The power control device carry out having prepared an output means output contents including two or more information sequences, the division means which divide each above-mentioned information sequence in the above-mentioned contents, and make into a partial information sequence, the digital-watermarking extract means extract the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, and the comparison means compare each embedding information by which an extract was carried out [above-mentioned], and control the above-mentioned output means according to a comparison result as the description.
[Claim 19] An output means to output contents including two or more information sequences, and the division means which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, A digital-watermarking extract means to extract the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, The power control device characterized by establishing a comparison means to compare an operation means to calculate to one of the above-mentioned embedding information with the value and the above-mentioned partial information sequence which were searched for by the above-mentioned operation means, and to control the above-mentioned output means according to a comparison result.
[Claim 20] The above-mentioned operation means is a power control device according to claim 19 characterized by calculating the above-mentioned whole partial information sequence or some compression values.
[Claim 21] The power control device according to claim 19 characterized by establishing a decode means to decode the encryption given to the above-mentioned embedding information which the above-mentioned digital-watermarking extract means extracted.
[Claim 22] The power control device according to claim 19 characterized by establishing an encryption means to encipher the result of an operation called for by the above-mentioned operation means.
[Claim 23] The power control device according to claim 18 or 19 with which two or more information sequences included in the above-mentioned contents are characterized by being image information and speech information.
[Claim 24] The power control device according to claim 18 or 19 characterized by being data showing the predetermined object in the contents in which the information sequence included in the above-mentioned contents contains the data showing two or more objects.
[Claim 25] The power control device characterized by to establish the division means which divides at least one information sequence of each above-mentioned information sequence in contents including two or more information sequences, and makes into a partial information sequence, a digital-watermarking extract means extract the embedding information currently embedded as digital watermarking for the above-mentioned partial information sequence, and an output means output the above-mentioned embedding information as one of the information sequences included in the above-mentioned contents.
[Claim 26] The power control device according to claim 25 characterized by establishing the decode means which decodes the code which was extracted by the above-mentioned digital-watermarking extract means, and which embeds and is given to information.
[Claim 27] The power control device according to claim 25 characterized by for the embedding-ed information that the above-mentioned digital watermarking is embedded being voice or image information, and the above-mentioned embedding information being an image or speech information while two or more information sequences included in the above-mentioned contents are image information and speech information.
[Claim 28] The power control device according to claim 25 characterized by being data showing the predetermined object in the contents in which the information sequence, the above-mentioned embedding-ed information, and the above-mentioned embedding information which are included in the above-mentioned contents contain the data showing two or more objects.
[Claim 29] The power control device characterized by to establish an extract means embed from the information sequence where the above-mentioned digital watermarking in contents including two or more information sequences including at least one enciphered information sequence and the information sequence where at least one digital watermarking was embedded was embedded, and extract information, and a decode means decode the code given to the above-mentioned information sequence by using the above-mentioned embedding information as a decode key.
[Claim 30] The power control device according to claim 29 characterized by for the information sequence by which encryption was carried out [above-mentioned] being an image or speech information, and the information sequence where the above-mentioned digital watermarking was embedded being voice or image information.
[Claim 31] The power control device according to claim 29 characterized by being data showing the predetermined object in the contents in which the information sequence where the information sequence and the above-mentioned digital watermarking by which encryption was carried out [above-mentioned] were embedded contains the data showing two or more objects.
[Claim 32] The storage which memorized the program for performing processing which generates embedding information to each above-mentioned information sequence in contents including two or more information sequences, respectively, and processing which embeds each embedding information by which generation was carried

out [above-mentioned] as digital watermarking to each information sequence and in which computer reading is possible.

[Claim 33] The storage possible in computer reading memorized the program for performing the processing which outputs contents including two or more information sequences, the processing which divide each above-mentioned information sequence in the above-mentioned contents, and make into a partial information sequence, the processing which extract the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, and the processing which compare each embedding information by which an extract was carried out [above-mentioned], and control the above-mentioned output according to a comparison result.

[Claim 34] The processing which outputs contents including two or more information sequences, and the processing which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, The processing which extracts the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, The storage which memorized the program for performing processing which compares with the above-mentioned partial information sequence the processing which calculates to one of the above-mentioned embedding information, and the value calculated by the above-mentioned operation, and controls the above-mentioned output according to a comparison result and in which computer reading is possible.

[Claim 35] The storage which memorized the program for performing the processing which divides at least one information sequence of each above-mentioned information sequence in contents including two or more information sequences, and makes into a partial information sequence, the processing which extract the embedding information currently embedded as digital watermarking for the above-mentioned partial information sequence, and the processing which output the above-mentioned embedding information as one of the information sequences included in the above-mentioned contents and in which computer reading is possible.

[Claim 36] The storage which memorized the program for performing ****** which embeds from the information sequence where the above-mentioned digital watermarking in contents including two or more information sequences including at least one enciphered information sequence and the information sequence where at least one digital watermarking was embedded was embedded, and extracts information, and the processing which decode the code given to the above-mentioned information sequence by using the above-mentioned embedding information as a decode key and in which computer reading is possible.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is used when embedding digital watermarking for protection of copyrights to the contents containing an image and voice, such as video, a TV program, and a movie, it is used for output controls, such as a playback output of the suitable above-mentioned contents which and were recorded, and relates to a suitable power control device and the storage which is used for them and in which computer reading is possible.
[the contents] [digital-watermarking embedding]
[0002]
[Description of the Prior Art] There is technique called digital watermarking as one of the technique for protecting the unjust copy of contents, such as an image, music, and a movie, from the former. Digital watermarking is the technique of embedding the information for preventing injustice to contents in the form which cannot be perceived to human being. In that case, although digital contents embed information in the condition as it is, analog KONCHINTSU embeds information, after digitizing.
[0003] Hereafter, the typical thing of an approach to embed the former of digital watermarking to contents is described. If it says in the case of a digital image, the technique of calculating to the data value of the digital contents which hit the hue of a pixel, lightness, etc., and embedding digital watermarking is one of typical things of the information embedding method of digital watermarking to a static image. Digital contents are divided into a block and the technique of the Digimarc woods of spacing and adding a pattern, and a U.S. Pat. No. 5,636,292 number which is the combination of +1 and -1 and which was decided beforehand is one of typical things of this technique for every block.
[0004] After performing frequency conversion, such as a fast Fourier transform, a discrete cosine transform, and wavelet transform, spacing through a frequency domain and adding information to digital contents as the digital-watermarking embedding approach for other static images, there is the technique of performing embedding by performing reverse frequency conversion.
[0005] By the technique by the above-mentioned fast Fourier transform, after input contents added and diffuse PN sequence, they are divided into a block. And the Fourier transform is performed for every block and 1-bit watermark information is embedded at 1 block. An inverse Fourier transform is given and, as for the block with which this watermark information was embedded, the contents where the again same PN sequence as the beginning was added, and digital watermarking was embedded are obtained. This will be detailed in Onishi, **, Matsui, and "watermark signing method to image by PN sequence" 1997 to a code, information security symposium lecture collected works, and SCIS97-26B.
[0006] The technique by the discrete cosine transform is divided into a block, and carries out a discrete cosine transform for every block. And after embedding 1-bit information at 1 block, inverse transformation is carried out and digital-watermarking embedding finishing contents are generated. This will be detailed in Nakamura, brook, and Takashima "digital-watermarking method in frequency domain for protection of copyrights of digital image" 1997 to a code, information security symposium lecture collected works, and SCIS97 and 26A.
[0007] The technique by wavelet transform is technique to twist the need of carrying out block division of the input contents. This will be detailed in Ishizuka, Sakai, Sakurai, and "experimental consideration about safety and dependability of electronic watermark technique using wavelet transform" 1997 to a code, information security symposium lecture collected works, and SCIS97-26D.
[0008] The embedding of digital watermarking is possible also for the case of voice data by the approach of performing frequency conversion, embedding of digital watermarking, and reverse frequency conversion like a static image after blocking. After specifically taking out some basis functions from the basis function group of 1-dimensional voice data expressed with the form of those primary association by making into a basis function group the trigonometric function from which a period differs and shifting some phases, even if it restores to voice data again, there is an approach using the acoustic-sense property of human being that the difference from the original data cannot be perceived.
[0009] Moreover, there is a method of carrying out wavelet transform of the digital voice data expressed as a 1-dimensional real valued function, and performing embedding to the obtained wavelet multiplier. The sound with this quiet approach uses the acoustic-sense property of being scratched out by the loud sound. About the detail of such technique, it is detailed to Inoue Japan cedar "code system of digital-watermarking 1 multimedia itself" Maruyama Gakugei Tosho.

[0010] Moreover, the approach of embedding at a motion vector and the approach of combining the dynamic image from the camera which photos a photographic subject from a delicately different include angle of two sets are learned as a digital-watermarking embedding technique of dynamic-image DETAHE besides the embedding to the static image of digital watermarking, and the embedding to voice.
[0011] Next, after explaining the principle of the dynamic-image compression method MPEG equipped with the general coding means in a frame, and the interframe coding means, the technique of embedding digital watermarking at the motion vector of dynamic-image data is explained. the difference which dropped the redundancy of time amount shaft orientations on taking inter-frame difference at MPEG, and was obtained by this — high efficiency coding is realized for data as a whole DCT and by carrying out variable-length-coding processing and dropping the redundancy of the direction of space. About the redundancy of the above-mentioned time-axis direction, it becomes possible to drop redundancy on the frame and time amount target which correlation of the frame which continued in the case of the animation tends to encode paying attention to a high thing by taking difference with precedence or the frame which carries out backward.
[0012] then, difference with the frame preceded in time besides the Indra coded image (I-picture) obtained in the agreement-ized mode encoded within a frame — with the forward prediction coded image (P-picture) which encodes a value It has the both-directions predicting-coding image (B-picture) which encodes among values what has the fewest amount of data. difference with the frame preceded in time or the frame which carries out backward — difference with the interpolation frame from values or both those frames — Each frame by these agreement-ized modes is combined in predetermined sequence.
[0013] In MPEG above-mentioned I-picture, P-picture, and B-picture, respectively One sheet, By recommending the combination which considers as one unit (GOP) by four sheets and ten sheets, allots I-picture to a head, and repeats and allots B-picture of two sheets, and P-picture, and placing I-picture a fixed period While making possible partial regeneration which made the unit special playback of reverse playback etc., and this GOP, prevention of error propagation is aimed at.
[0014] moreover, the direction which took difference with the frame which carries out backward when a new body appears in a frame, rather than it takes difference with the frame preceded in time — the difference — a value may decrease then, the both-directions predicting coding above in MPEG — carrying out — more — high — efficiency compression is performed.
[0015] Moreover, a motion compensation is performed in MPEG. That is, per predetermined block (macro block) which collected [data / brightness] 2 blocks of blocks of 8 pixel x8 pixel about 4 blocks and color difference data, difference with precedence or the macro block near the correspondence block of a backward frame is taken, by searching for the macro block with few differences, a motion vector is detected and this motion vector is encoded as data.
[0016] In the case of decode, the correspondence macro block data of precedence or a backward frame is extracted using this motion vector, and the coded data encoded by this using the motion compensation is decoded. Once encoding the frame preceded in time on the occasion of the above motion compensations, the frame decoded again is obtained, it considers as a precedence frame, and a motion compensation is performed using the macro block in this frame, and the macro block of the frame which it is going to encode.
[0017] Then, migration of one motion vector is spaced and it is made to correspond to 1 bit of an informational bit string by the method which embeds digital watermarking at a motion vector. That is, visually, a vector is not moved [to set the value of this bit to 1 / which cannot be recognized] for this vector to carry out extent migration and set a value to 0. By performing this processing to many motion vectors, the approach of embedding all watermark information is taken.
[0018] Moreover, in MPEG-4 under current standardization activity, the processing which piles up two or more video plane was introduced. Thereby instead of coding for every macro block, the processing in the field of the profile of arbitration of coding in the object unit on an image etc. was attained. MMR and algebraic-sign-ization are used for profile coding.
[0019] Next, how to combine the dynamic image from the camera which photos a photographic subject from a delicately different include angle of two sets is explained. Two cameras are installed so that a photograph can be taken from a delicately different include angle to one photographic subject. Since the include angle which two cameras make by making a photographic subject into top-most vertices is very small, the image photoed with two cameras is not discriminable by human being's eyes.
[0020] Two cameras are set to A and B. The image photoed with Cameras A and B is respectively divided for every frame, and they are them (a1 and a2 .... an), (b1, b2 .... It considers as bn). An image is chosen as random from the frame of the image which Cameras A and B photoed, and a subject-copy image is created. For example, a subject-copy image is (a1, and a2, b3, a4 and b5.... It becomes bn). One frame is spaced and it is made to correspond to 1 bit of an informational bit string here. That is, a frame is replaced with the frame of another side to set the value of this bit to 1. A frame is not replaced to set the value of a bit to 0. All watermark information is embedded by performing this processing to many frames.
[0021]
[Problem(s) to be Solved by the Invention] The digital-watermarking embedding method to the contents which have a conventional image and voice, such as a movie, was what performs embedding separately to an image and voice, respectively. for this reason, although the copyright in an image, and voice the simple substance of each can be protected, there was a limitation in protecting copyright synthetically as contents which have both an image and

voice.
[0022] This invention was accomplished in order to solve the above-mentioned problem, and it aims at enabling it to embed digital watermarking which can protect an image and the copyright of audio contents synthetically.
[0023]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, in the digital-watermarking embedding equipment by this invention, an information generation means to generate embedding information to each above-mentioned information sequence in contents including two or more information sequences, respectively, and the embedding means which embeds each embedding information by which generation was carried out [above-mentioned] as digital watermarking to each information sequence are established.
[0024] Moreover, it sets to the power control device by this invention. An output means to output contents including two or more information sequences, and the division means which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, A digital-watermarking extract means to extract the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, and a comparison means to compare each embedding information by which the extract was carried out [above-mentioned], and to control the above-mentioned output means according to a comparison result are established.
[0025] Moreover, it sets to other power control devices by this invention. An output means to output contents including two or more information sequences, and the division means which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, A digital-watermarking extract means to extract the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, An operation means to calculate to one of the above-mentioned embedding information is compared with the value and the above-mentioned partial information sequence which were searched for by the above-mentioned operation means, and a comparison means to control the above-mentioned output means according to a comparison result is established.
[0026] Moreover, in other power control devices by this invention, the division means which divides at least one information sequence of each above-mentioned information sequence in contents including two or more information sequences, and makes into a partial information sequence, a digital-watermarking extract means extract the embedding information currently embedded for the above-mentioned partial information sequence as digital watermarking, and an output means output the above-mentioned embedding information as one of the information sequences included in the above-mentioned contents have established.
[0027] Moreover, an extract means embed from the information sequence where the above-mentioned digital watermarking in contents including two or more information sequences which include at least one enciphered information sequence and the information sequence where at least one digital watermarking was embedded in other power control devices by this invention was embedded, and extract information, and a decode means decode the code given to the above-mentioned information sequence by using the above-mentioned embedding information as a decode key have established.
[0028] Moreover, in the storage by this invention, the program for performing processing which generates embedding information to each above-mentioned information sequence in contents including two or more information sequences, respectively, and processing which embeds each embedding information by which generation was carried out [above-mentioned] as digital watermarking to each information sequence is memorized.
[0029] Moreover, it sets to other storages by this invention. The processing which outputs contents including two or more information sequences, and the processing which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, The program for performing processing which extracts the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, and processing which compares each embedding information by which the extract was carried out [above-mentioned], and controls the above-mentioned output according to a comparison result is memorized.
[0030] Moreover, it sets to other storages by this invention. The processing which outputs contents including two or more information sequences, and the processing which divides each above-mentioned information sequence in the above-mentioned contents, and is made into a partial information sequence, The processing which extracts the embedding information currently embedded as digital watermarking for each above-mentioned partial information sequence, The processing which calculates to one of the above-mentioned embedding information, and the value calculated by the above-mentioned operation are compared with the above-mentioned partial information sequence, and the program for performing processing which controls the above-mentioned output according to a comparison result is memorized.
[0031] Moreover, it sets to other storages by this invention. The processing which divides at least one information sequence of each above-mentioned information sequence in contents including two or more information sequences, and is made into a partial information sequence, The program for performing processing which extracts the embedding information currently embedded as digital watermarking for the above-mentioned partial information sequence, and processing which outputs the above-mentioned embedding information as one of the information sequences included in the above-mentioned contents is memorized.
[0032] Moreover, it sets to other storages by this invention. ****** which embeds from the information sequence where the above-mentioned digital watermarking in contents including two or more information sequences including at least one enciphered information sequence and the information sequence where at least one digital watermarking

was embedded was embedded, and extracts information, The program for performing processing which decodes the code given to the above-mentioned information sequence by using the above-mentioned embedding information as a decode key is memorized.

[0033]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with a drawing. Drawing 1 is the block diagram showing the gestalt of operation of the digital-watermarking embedding equipment by this invention. It connects with two sets of video tape recorders, for example, a playback side and an image transcription side, and this equipment is used. In a playback side video tape recorder, the original video tape before embedding digital watermarking is played. The image and voice which were reproduced are inputted into digital-watermarking embedding equipment from an image output terminal and a voice output terminal, respectively. Moreover, the image and voice where digital watermarking was embedded are inputted and recorded on an image transcription side video tape recorder by digital-watermarking embedding equipment.

[0034] This equipment has the A/D-conversion equipments 103 and 104 and the digital-watermarking embedding equipment 105 which change the image input unit 101 which incorporates the video signal of an analog to this equipment, the audio input unit 102 which incorporates the sound signal of an analog to this equipment, the inputted image, or voice into digital data.

[0035] The above-mentioned digital-watermarking embedding equipment 105 is the thing which receives the input from the outside , or generated the embedding information embed as digital watermarking by the approach of an operation generate information from the image or the voice data inputted into this equipment , and generated further using key data , such as coordinate information which shows the location which embeds digital watermarking save at nonvolatile memory 107 , and which embeds and embeds to contents by make information into digital watermarking .

[0036] This equipment controls each equipment carried in the nonvolatile memory 107 where the key data which consist of the volatile memory 106 used since data are saved still more temporarily, the coordinate data in which the embedding location of digital-watermarking embedding is shown are saved, and this equipment. The image and voice which had digital watermarking embedded by the controller 108 which performs the digital-watermarking embedding method by the gestalt of this operation, the D/A inverters 109 and 110 which change into analog data the digital data to which embedding processing of digital watermarking was performed with this equipment, and this equipment It has the data bus 113 used for exchanging digital data between each equipment which constitutes the image output unit 111 outputted to a video tape recorder etc. and an audio output device 112, and this equipment.

[0037] Next, actuation is explained. It is reproduced with a playback side video tape recorder, and the analog image data outputted from the image output terminal is inputted from the image input device 101 of this digital-watermarking embedding equipment, is changed into digital data with A/D-conversion equipment 103, and is saved at volatile memory 106. The analog voice data similarly outputted from the voice output terminal of a playback side video tape recorder is inputted from an audio input unit 102, is changed into digital data by A/D-conversion equipment 104, and is saved at volatile memory 106.

[0038] With digital-watermarking embedding equipment 105, the embedding data embedded as digital watermarking are generated by calculating or receiving an input from the exterior using the image and/or voice data which are saved at volatile memory 106, etc. Next, digital-watermarking embedding equipment 105 is embedded at an image and/or voice data using the key data saved at nonvolatile memory 107 by making into digital watermarking the embedding data which carried out [above-mentioned] generation.

[0039] The image and/or voice data with which digital watermarking was embedded are respectively analog-ized by the D/A inverters 109 and 110. The analog-ized video signal is inputted into the image input terminal of an image transcription side video tape recorder by the image output unit 111, and the analog-ized sound signal is inputted into the voice input terminal of an image transcription side video tape recorder by the audio output device 112, and is recorded, respectively.

[0040] Drawing 2 shows the gestalt of operation of the output unit by this invention which prevented from reproducing the record medium with which contents are recorded, when alteration processing of putting in a title unjustly, dubbing to the contents where digital watermarking was embedded by the digital-watermarking embedding equipment of drawing 1 is performed.

[0041] This output unit reads the signal memorized by the record medium. With the deck section 201 and the power control device 207 which are separated and outputted to a sound signal and a video signal To the audio output device 202 controlled and this appearance, with a power control device 207 Each equipment which constitutes the A/D-conversion equipments 204 and 205 which the sound signal and video signal which the image output unit 203 controlled and the deck section 201 outputted are digitized, and are changed into voice data and image data, and equipment is controlled. It has the controller 206 which performs the output method by the gestalt of this operation.

[0042] Furthermore, it has the data bus 210 temporarily used for exchanging digital data between each equipment which constitutes the nonvolatile memory 209 where the key data which consist of the coordinate information which shows the embedding location for a power control device 207, data and the volatile memory 208 used since a result etc. is saved in the middle of an operation, and digital-watermarking embedding are saved, and this equipment.

[0043] Next, actuation is explained. If a record medium is reproduced in the deck section 201, the signal currently recorded on the record medium will be read and it will separate into a sound signal and a video signal. A sound signal is inputted into an audio output device 202, a video signal is inputted into the image output unit 203, respectively, and it is saved temporarily. Moreover, a sound signal is changed into A/D-conversion equipment 204 by A/D-

conversion equipment 205, a video signal is changed into digital data (voice data and image data), respectively, and it is saved temporarily at volatile memory 208.
[0044] A power control device 207 acquires voice data and image data from volatile memory 208, extracts the information currently embedded as digital watermarking at image data and/or voice data using the key data saved at nonvolatile memory 209, and opts for or controls the voice output by the audio output device 202 and the image output unit 203, and a video output by the result.
[0045] Next, the gestalt of each implementation of embedding processing of the generation of concrete embedding data and digital watermarking by digital-watermarking embedding equipment 105 and the output-control processing by the power control device 207 is explained.
[0046] Drawing 3 is the block diagram showing the gestalt of the operation of the 1st of a digital-watermarking embedding method performed with digital-watermarking embedding equipment 105. In this method, an image is divided into a frame and it embeds on each frame by making into digital watermarking the frame number which assigned and assigned the frame number to each frame. Moreover, voice is divided into a block and it embeds at each block by making into digital watermarking the block number which assigned and assigned the block number to each block.
[0047] This method consists of a frame logging means 301 divide image data for every frame, the frame-number generation means 302 which numbers a frame sequentially from a head, the digital-watermarking embedding means 303 which embeds a frame number on each frame of an image, a block division means 304 divide voice data into a block, a block number generation means 305 which number a voice block sequentially from a head, and a digital-watermarking embedding means 306 which embed a block number at each audio block.
[0048] Next, actuation is explained. By the frame logging means 301, the inputted image data are divided into a frame and outputted in order. Each outputted frame is inputted into the frame number generation means 302, and a frame number is generated in order. Moreover, the key data which consist of coordinate information which shows the location which embeds digital watermarking memorized by each frame, the frame number generated by the frame number generation means 302, and nonvolatile memory 107 are inputted into the digital-watermarking embedding means 303, and a frame number is embedded as digital watermarking on each frame, and is outputted to it. In addition, there are also cases in the case of being inputted from external storage etc., without reading key data from nonvolatile memory.
[0049] The block similarly divided by the block division means 304 is inputted into the block number generation means 305 also about voice data, and a block number is generated. Moreover, the key data which consist of coordinate information which shows each block, the block number generated by the block number generation means 305, and the location which embeds digital watermarking are inputted into the digital-watermarking embedding means 306, and a block number is embedded and outputted to each block by digital watermarking.
[0050] After a video output here and a voice output are saved temporarily at volatile memory 106 and have a synchronization taken, they are changed into analog data by the D/A inverters 109 and 110, and are outputted from the image output unit 111 and an audio output device 112.
[0051] Drawing 4 is the block diagram showing the gestalt of operation of the 1st of the output-control method corresponding to the digital-watermarking embedding method of drawing 3 , and is used for the power control device 207 in drawing 2 . The method of drawing 4 As digital watermarking from each frame of a frame logging means 401 to perform the same actuation as the frame logging means of drawing 3 , and an image As digital watermarking from each block of a digital-watermarking extract means 402 to extract the frame number currently embedded, a block division means 403 to perform the same actuation as the block division means of drawing 3 , and voice The digital-watermarking extract means 404 and block number which extract the block number currently embedded are compared with a frame number, and it consists of comparison means 405 to investigate whether right correspondence is carried out.
[0052] Next, actuation is explained. The inputted image data are inputted into the frame logging means 401, and are divided for every frame. Each deflection 1 MU is inputted into the digital-watermarking embedding means 402 with the key data which consist of coordinate information which shows the location where digital watermarking is embedded, and a frame number is extracted. Moreover, the inputted voice data is inputted into the block division means 403, and is divided into a block, and a block number is extracted from each block by key data in the digital-watermarking extract means 404.
[0053] When the frame number extracted by the digital-watermarking extract means 402 and the block number extracted by the digital-watermarking extract means 404 are inputted into the comparison means 405 and right correspondence is being carried out, the signal with which an output is usually permitted is emitted and an image is outputted for voice by the image output unit 203 from an audio output device 202 with this signal, respectively.
[0054] Drawing 5 is the block diagram showing the gestalt of operation of the 2nd of a digital-watermarking embedding method. This method receives the informational input other than image data and voice data, and encodes and embeds the information inputted into an image and voice.
[0055] The frame logging means 501 divide image data for every frame, the block division means 502 divide voice data into a block, the information input means 503 embed from the exterior and a means inputs information, the coding means 504 embed the data data were inputted and make a means into information, the digital-watermarking embedding means 505 of an image which embed on a frame and embed information as digital watermarking, and the digital-watermarking embedding means 506 which embed at the block of voice and embed information as digital watermarking are consisted of by this method.

[0056] With the frame logging means 501, voice data is respectively divided into a frame and a block for the inputted image data by the block division means 502 again. Moreover, as for the embedding information embedded as digital watermarking inputted by the information input means 503, such as a keyboard, coding of error-correcting-code-izing etc. is performed by the coding means 504. The encoded embedding information is inputted into the digital-watermarking embedding means 505 with a frame and key data, and is embedded on the frame of an image as digital watermarking.
[0057] Moreover, embedding information is inputted into the digital-watermarking embedding means 506 with a block and key data, and is embedded on an audio frame as digital watermarking. At this time, digital watermarking may be embedded at some image frames besides in the case of being embedded at all image frames and voice blocks, and a voice block.
[0058] Moreover, in the output-control method of drawing 4 , the output-control method corresponding to the digital-watermarking embedding method of drawing 5 can be constituted by comparing the information currently embedded on the predetermined image frame with the comparison means 405 with the information currently embedded at the predetermined voice block. Under the present circumstances, when embedding information is error-correcting-code-ized, the comparison means 405 decodes an error correcting code, before comparing information.
[0059] In drawing 5 , the coding means 504 can embed, informational error correcting code-ization can be performed, and the digital-watermarking embedding method which writes either an information bit or a redundant bit in an image frame, and writes another side in a voice block can also be realized easily. Moreover, in drawing 4 , an information bit is error-correcting-code-ized and a corresponding output-control method can also consist of comparison means 405 easily by measuring the redundant bit which was able to be found, and the redundant bit extracted from digital watermarking.
[0060] In drawing 5 , the coding means 504 can decompose predetermined embedding information into two bit strings, and the digital-watermarking embedding method which embeds one side at image FUMU and embeds another side at a voice block can also be realized easily. Moreover, in the output-control method of drawing 4 , the approach of embedding which compounded two extracted information and was restored with the comparison means 405 can also constitute a corresponding output-control method easily by checking that it is in agreement with the above-mentioned predetermined information.
[0061] Drawing 6 is the block diagram showing the gestalt of operation of the 3rd of a digital-watermarking embedding method. This method divides voice data into the block of the same number as an image frame number, makes an image frame and a voice block correspond to one to one, and embeds the voice block corresponding to an image frame.
[0062] This method divides image data into a frame, and consists of a frame logging means 601 to output one frame at a time, a block division means 602 which divides voice data into the same die length as the display time of one frame of an image frame, and is considered as a block, and a digital-watermarking embedding means 603 which embeds a voice block on an image frame.
[0063] By the frame division means 601, the inputted image data are divided for every frame, and are outputted in order. Moreover, by the block division means 602, the inputted voice data is divided into the same number as an image frame, and is outputted in order. With a digital-watermarking embedding means 603 to undergo the output of the frame division means 601 and the block division means 602, with the key data which consist of coordinate information which shows the location which embeds digital watermarking, a voice block is embedded as digital watermarking on a frame, and is outputted to it.
[0064] Drawing 7 is the block diagram showing the gestalt of operation of the 2nd of the output-control method corresponding to the digital-watermarking embedding method of drawing 6 . Frame logging is carried out and this method consists of the digital-watermarking extract means 702 and the D/A conversion means 703 of extracting the voice block to which an image is divided into a frame and which is embedded on the means 701 and the image frame. As for the D/A conversion means 703, processing shall be performed by the audio output device 202 as an example.
[0065] The video signal read from the medium in the deck section 201 is changed into digital data by A/D-conversion equipment 205 at being inputted into the image output unit 203, and coincidence. The image data changed into the digital data are divided by the frame logging means 701 for every frame, and the voice block currently embedded from key data is extracted in the digital-watermarking extract means 702. The extracted voice block is analog-data-ized by the D/A conversion means 703, and is outputted by the audio output device 202.
[0066] Drawing 8 is the block diagram showing the gestalt of operation of the 4th of a digital-watermarking embedding method. Voice data is divided into the block of the same number as an image frame number, and an image frame and a voice block are made to correspond to one to one by this method. Moreover, each voice block is enciphered and an encryption voice block is embedded on a corresponding image frame.
[0067] This method consists of a frame logging means 601 to perform the same actuation as drawing 6 , a block division means 602, a digital-watermarking embedding means 603, and an encryption means 801. Public-key-encryption-ized methods, such as common key encryptosystem-ized methods, such as DES, and RSA, are used for encryption used here (the detail of each code is referring to Eiji Okamoto work "guide to code theoretical" KYORITSU SHUPPAN Co., Ltd.).
[0068] It is enciphered by the inputted cryptographic key with the encryption means 801, and after being divided into the block of the same number as an image frame, in the digital-watermarking embedding means 603, the

inputted voice data is embedded by the block division means 602 as digital watermarking on an image frame with key data, and is outputted by it.

[0069] Drawing 9 is the block diagram showing the gestalt of operation of the 3rd of the output-control method corresponding to the digital-watermarking embedding method of drawing 8 . This method consists of a decode means 901 corresponding to a frame logging means 701 to perform the same actuation as the output-control method of drawing 7 , the digital-watermarking extract means 702, the D/A conversion means 703, and the encryption means 801 of drawing 8 .

[0070] The inputted image data are divided into a frame by the frame logging means 701. The digital-watermarking extract processing 702 extracts the voice block currently embedded as digital watermarking from each frame using key data. After the extracted voice block is decoded by the decode means 901, it is changed into a sound signal by the D/A conversion means 703, and is outputted by the audio output device 202.

[0071] Drawing 10 is the block diagram showing the gestalt of operation of the 5th of a digital-watermarking embedding method. In this method, voice is divided into a block and the frame displayed during voice block playback using the cryptographic key which generated and generated the group of a cryptographic key and a decode key for every block is enciphered. Moreover, a decode key is embedded as digital watermarking at a voice block.

[0072] This method consists of a frame logging means 1001 to divide an image into a frame, a key generation means 1002 to generate the group of a cryptographic key and a decode key, an encryption means 1003, a block division means 1004 to divide voice data into a block, and a digital-watermarking embedding means 1005. Public-key-encryption-ized methods, such as common key encryptosystem-ized methods, such as DES, and RSA, are used for encryption used here.

[0073] It is divided into a frame by the frame logging means 1001, and voice data is divided into a block for the inputted image data by the block part side means 1004. On the other hand, with the key generation means 1002, the group of a cryptographic key and a decode key is generated to each voice block. Moreover, with the encryption means 1003, the image frame displayed during voice block playback is enciphered and outputted using the cryptographic key generated with the key generation means 1002. Moreover, the digital-watermarking embedding means 1005 embeds and outputs voice DETAHE divided into the block, and the decode key generated with the key generation means 1002.

[0074] Drawing 11 is the block diagram showing the gestalt of operation of the 4th of the output-control method corresponding to the digital-watermarking embedding method of drawing 10 . This method consists of a block division means 1101 to divide voice data into a block, the digital-watermarking extract means 1102, a frame logging means 1103 to divide image data into a frame, a decode means 1104 to decode the code given to the frame, and a D/A conversion means 1105 performed by the image output unit 203 as an example.

[0075] The inputted voice data is divided by the block division means 1101 for every block, and is inputted into the digital-watermarking extract means 1102 with the key data which consist of coordinate information which shows the embedding location of a watermark. With the digital-watermarking extract means 1102, the decode key currently embedded as digital watermarking is extracted, and it inputs into the decode means 1104. Moreover, after image data are divided by the frame logging means 1103 for every frame, they are inputted into the decode means 1104 and decoded with a decode key. The decoded frame is changed into an analog signal by the D/A conversion means 1105, and is outputted by the image output unit 203.

[0076] Drawing 12 is the block diagram showing the gestalt of operation of the 6th of a digital-watermarking embedding method. In this method, voice is divided into a block and a voice block is ****-ized using the cryptographic key which generated and generated the group of a cryptographic key and a decode key for every block. Moreover, a decode key is embedded as digital watermarking at the image block of the head displayed during voice block playback.

[0077] This method consists of storage means 1206 for preparing a frame logging means 1204 to extract the frame which hits the head of a corresponding voice block from a block division means 1201 to divide voice into a block, a key generation means 1202 to generate the group of a cryptographic key and a decode key, the encryption means 1203, and image data, the digital-watermarking embedding means 1205, and the sequence of a frame.

[0078] The inputted voice data is divided by the block division means 1201 for every block. Moreover, with the key generation means 1202, the group of the cryptographic key of the same number as a voice block and a decode key is generated. With the encryption means 1203, a voice block is enciphered and outputted using the cryptographic key generated with the key generation means 1202. moreover, the inputted image data are inputted with the frame by which the frame corresponding to the head of a voice block is extracted with the frame logging means 1204, the decode key generated by the digital-watermarking embedding means 1205 with the key generation means 1202 is embedded, and digital watermarking is not further embedded for the storage means 1206 — having — time — sequence — it is outputted correctly.

[0079] Drawing 13 is the block diagram showing the gestalt of operation of the 5th of the output-control method corresponding to the digital-watermarking embedding method of drawing 12 . This method consists of a frame logging means 1301 to extract the frame corresponding to the head of a voice block from image data, the digital-watermarking extract means 1302, a block division means 1303 to divide voice data into a block, a decode means 1304 to decode the code given to the voice block, and a D/A conversion means 1305 performed by the audio output device 202.

[0080] The frame corresponding to the head of a voice block with the frame logging means 1301 in the inputted image data is extracted. The extracted frame is inputted into the digital-watermarking extract means 1302 with the

key data which consist of coordinate information which shows the embedding location of a watermark. With the digital-watermarking extract means 1302, the decode key currently embedded on the frame as digital watermarking is extracted, and it inputs into the decode means 1304.
[0081] Moreover, the inputted voice data is divided into a voice block by the block division means 1303, and is inputted into the decode means 1304. A voice block is the decode means 1304, it is decoded with a decode key, is changed into an analog signal by the D/A conversion means 1305, and is outputted by the audio output device 202.
[0082] Drawing 14 is the block diagram showing the gestalt of operation of the 7th of a digital-watermarking embedding method. It becomes from the frame logging means 1401 which divides the inputted image data into a frame, a block division means 1402 divide voice data into the block of fixed length, a hash count means 1403 calculate the hash value of the assignment frame of image data, the digital-watermarking embedding means 1404 that embed the hash value of an image frame at a voice block, a hash count means 1405 calculate the hash value of a voice block of finishing [digital-watermarking embedding], the digital-watermarking embedding means 1406 which embed in the hash value of a voice block on a frame with an image frame, and a storage means 1407
[0083] The hash value used by this method is explained. Hash value h is the short output h which is the compression value of the long input train x searched for by Hash Function f:x->h. Moreover, on the other hand, it is a tropism function, and has the property in which it is difficult to ask for a different input x which fills f(x') =f (x), and x'. MD5 (Message Digest5), SHA (SecureHashAlgoritlhm), etc. are one of typical things of a Hash Function. About the detail of a Hash Function, it is detailed in Eiji Okamoto work "a guide to code theoretical" (KYORITSU SHUPPAN Co., Ltd.).
[0084] The inputted image data are saved for the storage means 1407, and also the embedding frame where the hash value of the hash frame which can calculate a hash value, and a voice block is embedded by the frame logging means 1401 is extracted. Moreover, voice data is divided into the block of predetermined length by the block division means 1402. Frame extract and block division are performed so that a hash frame and every one embedding frame may exist in the time amount corresponding to 1 block of voice data here.
[0085] The hash count means 1403 calculates a hash value from the hash frame called for by the frame logging means 1401. The digital-watermarking embedding means 1404 embeds a hash value into a voice block using the key data which consist of coordinate information which shows the location which embeds digital watermarking. The voice block with which digital watermarking was embedded is outputted as a voice output, and also it is inputted into the hash count means 1405, and a hash value is calculated. The calculated hash value is inputted into the digital-watermarking embedding means 1406, is embedded with key data, and is embedded as digital watermarking into a frame.
[0086] It is replaced with the frame to which the original image [where digital watermarking was embedded] data the frame is remembered to be by the storage means 1407 by embedding correspond, and is saved. After embedding for the storage means 1407 and saving an object frame, the image data saved for the storage means 1407 are outputted as a video output.
[0087] Drawing 15 is the block diagram showing the gestalt of operation of the 6th of the output-control method corresponding to the digital-watermarking embedding method of drawing 14 . This output-control method Voice data A block division means 1501 to divide into the block of predetermined die length, a frame logging means 1502 to embed with a hash frame from image data, and to extract a frame, a hash count means 1503 to calculate the hash value of a voice block, The hash value of the hash frame of image data A hash count means 1504 to calculate, a digital-watermarking extract means 1505 to extract the hash value currently embedded at the voice block, a digital-watermarking extract means 1506 to extract the hash value of the voice block currently embedded on the embedding frame, It consists of a comparison means 1507 to compare the hash value which embedded with the hash value calculated from the voice block, and was extracted from the frame, and a comparison means 1508 to compare the hash value calculated from the hash frame with the hash value extracted from the voice block.
[0088] The inputted voice data is divided into the block of predetermined die length by the block division means 1501. The divided block is inputted into the hash count means 1503 for every block, and a hash value is calculated. It is inputted also into the digital-watermarking extract means 1505 at coincidence, and the hash value of the hash frame of the image data currently embedded as digital watermarking is extracted.
[0089] Moreover, the inputted image data are inputted into the frame logging means 1502, it embeds with a hash frame, and a frame is extracted. A hash frame is inputted into the hash count means 1504, and a hash value is calculated. Moreover, an embedding frame is inputted into the digital-watermarking extract means 1506, and the hash value currently embedded is extracted. The hash value of the voice block calculated by the hash count means 1503 and the hash value which embedded with the digital-watermarking extract means 1506, and was extracted from the frame are inputted and compared with the comparison means 1507.
[0090] When each hash value is in agreement (i.e., when voice data is judged to be in agreement with original voice data), a control signal is emitted so that an audio output device 202 may output voice. When each hash value is not in agreement, an audio output device 202 emits a control signal so that the saved voice block may be thrown away without outputting anything.
[0091] Moreover, the hash value calculated from the hash frame by the hash count means 1504 and the hash value extracted from the voice block by the digital-watermarking extract means 1505 are inputted and compared with the comparison means 1508. When a control signal is emitted so that the image output unit 203 may output an image, when each hash value is in agreement (i.e., when image data are judged to be in agreement with original image data), and the hash value of ** is not in agreement, the image output unit 203 emits a control signal so that the saved

data may be thrown away without outputting anything.
[0092] Drawing 16 is the block diagram showing the gestalt of operation of the 8th of a digital-watermarking embedding method. This method consists of a frame logging means 1401 to perform the same actuation as drawing 14 , the block division means 1402, the hash count means 1403, the digital-watermarking embedding means 1404, the hash count means 1405, a digital-watermarking embedding means 1406, a storage means 1407, and encryption means 1601 and 1602 to encipher the hash value calculated with the hash count means 1403.1405.
[0093] The hash value of the hash frame generated by the hash count means 1403 is embedded by the digital-watermarking embedding means 1404 at a voice block, after being enciphered by the cryptographic key inputted with the encryption means 1601. Moreover, after being enciphered by the cryptographic key inputted with the encryption means 1602, the hash value of the voice block generated by the hash count means 1405 is embedded with the digital-watermarking embedding means 1406, and is embedded on a frame.
[0094] When the hash frame of an image is altered by having been with the encryption means, if a cryptographic key is not known even if a metaphor Hash Function is known, it cannot ask for the data embedded at a voice block. Therefore, more advanced security is securable. Public-key-encryption-ized methods, such as common key encryptosystem-ized methods, such as DES, and RSA, are used for encryption used here. Here, when it enciphers with the private key using public key cryptosystems, such as RSA, the value calculated serves as a digital signature.

[0095] Drawing 17 is the block diagram showing the gestalt of operation of the 7th of the output-control method corresponding to the digital-watermarking embedding method of drawing 16 . This method consists of decode means 1701 and 1702 corresponding to the block division means 1501, the frame logging means 1502, the hash count means 1503 and 1504, the digital-watermarking extract means 1505 and 1506, the comparison means 1507 and 1508, and the encryption means 1601 and 1602 of drawing 16 to perform the same actuation as drawing 15 .
[0096] The enciphered hash frame which was extracted from the voice block by the digital-watermarking extract means 1505 is decoded with the decode key inputted as the decode means 1701. Moreover, the enciphered voice frame which embedded with the digital-watermarking extract means 1506, and was extracted from the frame is decoded with the decode key inputted as the decode means 1702. The following actuation is the same as that of the output-control method of drawing 15 .
[0097] Here, as an example, when a digital signature is extracted by the digital-watermarking extract means 1505.1506, with the decode means 1701 and 1702, it decodes with the public key corresponding to the private key used for signature generation.
[0098] Drawing 18 is the block diagram showing the gestalt of operation of the 8th of the output-control method corresponding to the digital-watermarking embedding method of drawing 16 . This method consists of a block division means 1501 to perform the same actuation as drawing 15 , the frame logging means 1502, the hash count means 1503 and 1504, digital-watermarking extract means 1505 and 1506, comparison means 1507 and 1508, and encryption means 1601 and 1602 to perform the same actuation as drawing 16 .
[0099] The hash value calculated by the hash count means 1504 is inputted into the encryption means 1601, and it is enciphered by the same cryptographic key as the cryptographic key used with the digital-watermarking embedding means of drawing 16 at the time of digital-watermarking embedding, and it is inputted into the comparison means 1508. It is enciphered with the encryption means 1602 and the hash value similarly calculated with the hash count means 1503 is inputted into the comparison means 1507. Other actuation is the same as that of the output-control method of drawing 15 .
[0100] Although the digital-watermarking embedding equipment and the output unit treating analog audio video contents were mentioned as an example here, the digital-watermarking embedding equipment which embeds a watermark to other contents, the output units which perform control, such as digital video equipment treating digital contents, such as other analog contents, digital audio video contents, etc., etc., are included in **** of this invention.
[0101] Moreover, usable digital-watermarking embedding equipment is constituted from digital-watermarking embedding equipment shown in drawing 1 by the digital device treating digital contents by deleting the A/D-conversion equipments 103 and 104 and the D/A inverters 109 and 110.
[0102] Moreover, the digitized output device treating digital contents consists of output units shown in drawing 2 by deleting A/D-conversion equipment 204,205. Moreover, MPEG-4 image etc. embeds a watermark to each object in the contents containing two or more objects, and contains in **** of this invention an approach, equipment, etc. which control.
[0103] Moreover, in the embedding equipment 105 in drawing 1 , the digital-watermarking embedding equipment to MPEG-4 image is constituted by preparing object extract processing in which an object is extracted from MPEG-4 image, instead of a frame logging means and a flocks division means. Moreover, the output unit which controls an output by digital watermarking embedded in MPEG-4 image is constituted by performing processing which extracts an object instead of the power control devices in the output unit shown in drawing 2 being a frame logging means and a block division means.
[0104] Moreover, a digital-watermarking embedding method with more high security is constituted by combining the above-mentioned digital-watermarking embedding method. Furthermore, the output-control method which extracts digital watermarking and controls an output by the digital-watermarking embedding method which generated the above-mentioned digital-watermarking embedding method with this combination from the contents which embedded digital watermarking is easily constituted by combining and using the above-mentioned output-control method.

[0105] Next, the storage as a gestalt of other operations of this invention is explained. Although this invention can also be constituted from hardware, it can also constitute from a computer system which consists of a CPU and memory. When it constitutes from a computer system, the above-mentioned memory constitutes the storage by this invention. That is, the purpose of this invention can be attained by using the storage which memorized the program code of the software for performing actuation explained with the gestalt of each operation mentioned above with a system or equipment, and reading and performing the program code with which CPU of the system and equipment was stored in the above-mentioned storage.
[0106] Moreover, as this storage, semiconductor memory, such as ROM and RAM, an optical disk, a magneto-optic disk, a magnetic medium, etc. may be used, and these may be constituted and used for CD-ROM, a floppy disk, a magnetic medium, a magnetic card, a non-volatile memory card, etc.
[0107] Therefore, while a function equivalent to the gestalt of each above-mentioned implementation is realizable also by using with the alien systems and equipment other than the system which showed this storage in each drawing, or equipment, and reading and performing the program code with which that system or computer was stored in this storage, equivalent effectiveness can be acquired and the purpose of this invention can be attained.
[0108] Moreover, when OS which is working on a computer performs a part or all of processing, Or after the program code read from the storage was written in the memory with which the extension unit connected to the extension board inserted in the computer or the computer is equipped, Also when CPU with which the above-mentioned extension board and an extension unit are equipped performs a part or all of processing based on directions of the program code, while being able to realize a function equivalent to the gestalt of each above-mentioned implementation, equivalent effectiveness can be acquired and the purpose of this invention can be attained.
[0109]
[Effect of the Invention] As explained above, while the digital-watermarking embedding which gave relation mutually for the image and voice as two or more information sequences was realizable according to this invention, digital-watermarking embedding which combined an image and voice could be realized, and, thereby, the synthetic protection-of-copyrights method of the contents which have both an image and voice became possible.
[0110] Moreover, when injustice, such as an alteration, is performed to the contents to which digital watermarking was embedded according to this invention, it can be detected and it can control forbidding the output of contents etc.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the gestalt of operation of the digital-watermarking embedding equipment by this invention.
[Drawing 2] It is the block diagram showing the gestalt of operation of the output unit using the power control device by this invention.
[Drawing 3] It is the block diagram showing the gestalt of the operation of the 1st of a digital-watermarking embedding method performed with the digital-watermarking embedding equipment by this invention.
[Drawing 4] It is the block diagram showing the gestalt of the operation of the 1st of an output-control method performed with the power control device by this invention.
[Drawing 5] It is the block diagram showing the gestalt of operation of the 2nd of a digital-watermarking embedding method.
[Drawing 6] It is the block diagram showing the gestalt of operation of the 3rd of a digital-watermarking embedding method.
[Drawing 7] It is the block diagram showing the gestalt of operation of the 2nd of an output-control method.
[Drawing 8] It is the block diagram showing the gestalt of operation of the 4th of a digital-watermarking embedding method.
[Drawing 9] It is the block diagram showing the gestalt of operation of the 3rd of an output-control method.
[Drawing 10] It is the block diagram showing the gestalt of operation of the 5th of a digital-watermarking embedding method.
[Drawing 11] It is the block diagram showing the gestalt of operation of the 4th of an output-control method.
[Drawing 12] It is the block diagram showing the gestalt of operation of the 6th of a digital-watermarking embedding method.
[Drawing 13] It is the block diagram showing the gestalt of operation of the 5th of an output-control method.
[Drawing 14] It is the block diagram showing the gestalt of operation of the 7th of a digital-watermarking embedding method.
[Drawing 15] It is the block diagram showing the gestalt of operation of the 6th of an output-control method.
[Drawing 16] It is the block diagram showing the gestalt of operation of the 8th of a digital-watermarking embedding method.
[Drawing 17] It is the block diagram showing the gestalt of operation of the 7th of an output-control method.
[Drawing 18] It is the block diagram showing the gestalt of operation of the 8th of an output-control method.
[Description of Notations]
105 Embedding Equipment
108 206 Controller
207 Power Control Device
301, 401, 501, 601, 701, 1001, 1103, 1204, 1301, 1401, 1502 Frame logging means
302 Frame Number Generation Means
303, 306, 505, 506, 603, 1005, 1205, 1302, 1404, 1406 Digital-watermarking embedding means
304, 403, 502, 602, 1004, 1101, 1201, 1303, 1501 Block division means
305 Block Number Generation Means
402, 404, 702, 1102, 1302, 1505, 1506 Digital-watermarking extract means
405, 1507, 1508 Comparison means
503 Information Input Means
504 Coding Means
801, 1003, 1203, 1601, 1602 Encryption means
901, 1104, 1304, 1701, 1702 Decode means
1002 1202 Key generation means
1206 1407 Storage means
1403, 1405, 1503, 1504 Hash count means

[Translation done.]